OUR ASTRONOMICAL COLUMN.

Nebulosity in Star Clusters.—In a letter to the *Observatory* for June Dr. Harlow Shapley states that the appearance of nebulosity which has sometimes been noted in visual observations of star clusters has not been confirmed by the Mount Wilson photographs. In the case of the cluster No. 361 of Dreyer's Index Catalogue, the photographs show stars fainter than 18th magnitude, but there is no trace of nebulous matter. The cluster N.G.C. 6760, which has also often been observed visually as nebulous, appears purely stellar on the photographs. The actual connection between luminous nebulosity and star clusters seems to be limited to stellar groups of little condensation and richness, where the brighter stars are mainly of type A or B. In these cases the nebulosity becomes visible because of direct reflection of the light of the surrounding stars, and partly on account of selective secondary radiation. Thus the frequent association of diffuse nebulosity with blue stars of high temperature does not necessarily indicate immediate evolutionary relationship. There is at present no certain evidence of luminous nebulosity in globular clusters.

Interpretation of Stellar Types.—In a communication to the National Academy of Sciences, Washington, March, 1918, Prof. C. D. Perrine makes the interesting suggestion that the spectral class of a star is in part dependent upon the amount of cosmical matter in its neighbourhood and the relative velocity of the star and matter. Many of the A, B, and O stars, the gaseous nebulæ, the novæ, and possibly the Cepheid variables, on this hypothesis, are confined to the galaxy because there the energy derived from the matter swept up is in excess of that lost by radiation. The direction of spectral change under such conditions will be towards the nebulæ. In regions where there is little or no cosmical matter the energy gained from external sources is not sufficient to compensate for the loss of radiation, and the direction of change will be towards the later types. Upon this hypothesis the stars are probably all pursuing one definite course of very slow change towards extinction, but each individual star will be pursuing a course which may have many whole or partial cycles due to varying external causes.

The Strathmore Meteorite.—This remarkable meteorite fell on December 3, 1917, at 1.18 p.m. Though in full sunshine, its brilliance was compared with the limelight, and it left a trail. It was seen so far away as Hexham, 120 miles from the earth-point. Prof. R. A. Sampson gives an interesting account of it in the Proceedings of the Royal Society of Edinburgh (vol. xxxviii., part i., No. 10). He fixes the explosion point as twenty miles above Collessie, Fife. Four fragments have been found, one penetrating a roof near Coupar Angus; the largest, weighing 22½ lb., fell at Easter Essendy Farm, near Loch Marlee; it made a hole 20 in. deep, the rubbish being piled to the north-west, showing the direction of motion, which agrees with other indications. The fragments did not fall until some minutes after the sounds of explosion were heard, showing how much the speed (which must initially have been some miles per second, to account for the brilliancy) had been reduced by atmospheric resistance. Prof. Sampson explains the heating of meteors by supposing that the air in front of them has not time to escape, so is rapidly compressed. Assuming probable figures for mass and velocity, he shows that a temperature of 2000° might be produced. The meteor is of the stony class, to which many people assign a volcanic origin. In view of the difficulty of understanding how it could have escaped from our atmosphere without rupture, if expelled from a terrestrial volcano, Prof. Sampson suggests a lunar origin. In this case it might either describe an orbit within the earth-moon system, or, with a higher speed, a planetary orbit about the sun. The latter would seem the more likely, Mr. Denning having shown that it probably came from a known radiant in Sagitta, which is active early in December. The lunar origin would then imply that a large shower of fragments was expelled from the moon during a single eruption.

THE SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.

The twenty-third annual congress of the South-Eastern Union of Scientific Societies was held at Burlington House, in the Linnean Society's rooms, on May 29 and three following days, under the presidency of Sir Daniel Morris. The presidential address was entitled "The Geographical Distribution of Plants," and was, to some extent, concerned with the various means of dispersal of seeds and the manner in which geographical distribution was effected. The destruction of the flora of the Island of Krakatoa by volcanic eruption and the comparatively rapid growth of a new flora gave valuable evidence as to the manner and time required for replacing a destroyed flora. Transport by water-currents, through a powerful agent, would be assisted by the agency of birds, and meteorological agencies must not be wholly left out of the reckoning. Many seeds reach our own shores from tropical America by the agency of the Gulf Stream, but these have not been known to germinate in a natural state after transportation.

Mr. Percy Webb's paper on "Romano-British Mints" was an excellent summary of the subject. Mr. Webb pointed out that it was probable that the province of Britain, accustomed to use and strike coins for nearly two hundred years before the Roman invasion, kept its mints in some operation even under Roman rule. There is no clear identification of mints owing to the system of mint-marking not commencing until a late period. Claudius struck types of coins relating to Britain, but they were no doubt issued and used in Rome. Hadrian issued bronze pieces on which appears the seated figure of Britannia, her first appearance in history. These coins, and others of the same type issued by Antoninus Pius, suggest in their less accurate mintage, and from the fact that they have come to light in numbers in British finds, that they are of colonial origin. From Carausius and Allectus we have indisputable British issues, the former the founder of the short-lived first British Empire, the latter defeated and slain by the Romans on Wolmer Common, near Liss, where his military chest was exhumed in 1873, having been buried before battle with its contents of nearly 30,000 coins.

The subject of "Mosquitoes in England" was introduced for discussion by Sir Ronald Ross, and amongst those who took part in the discussion were Col. Buchanan, of the Local Government Board; Capt. MacDonald, and Mr. A. J. Grove. Sir Ronald Ross pointed out that malaria had formerly been prevalent in Britain, but had afterwards died out. Anophelines, however, continued to exist in certain low-lying parts, and recently evidence has been found to suggest that malaria has really continued all the time to be endemic to a very small degree in parts of Kent. Last year some cases undoubtedly occurred in this country. Certain alarmists are seriously perturbed by the possibilities of its greater prevalence. Sir Ronald came to the conclusion that the spread of malaria in a community must depend upon about fifteen different factors. "Of all the millions bred in a locality, pos-

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sibly only a few can ever succeed in biting a human being at all. Then only a proportion of these will generally have bitten an infected human being; and, again, only a smaller proportion will have bitten an infected person whose blood contains sexual parasites suitable for transmission into a mosquito. Hence the chances usually are that only a very small proportion of all the Anophelines in a place will ever become infected at all. But how many of these will infect healthy persons? A mosquito must live for about ten days at least before the parasites can mature in her body and enter her salivary glands, and of the small proportion of mosquitoes which may live long enough for this a still smaller proportion are likely to succeed in biting and infecting healthy persons afterwards. Men and mosquitoes may vary in individual resistance to parasites. Both will be infective to each other only at certain times. The general equations for diseases common to two species of hosts contain fifteen independent constants, or, rather, parameters—namely, the birth-rate, death-rate, immigration, emigration, immunity, infectivity, and recovery ratios for each species of host, and the contact ratio common to both; and the total proportion of infected individuals of either species must depend on all of these combined in certain mathematical functions." A special appeal was made to the members of local societies to make a study of the bionomics and distribution of mosquitoes in Britain.

A lecture was given by Mr. Reginald Smith, of the British Museum, on the "Geology of Flint Implements." In the course of many interesting remarks, the Mousterian cave-finds from St. Brelade, Jersey, were illustrated, and compared with certain surface-finds in England. The hope was expressed that further research in England, which had the advantage of the boulder-clay, might decide man's relation to the glacial period by associating definite types of flint-working with deposits both before and after the most intense glaciation of the country. Much information had been lost to science by inattention to the labelling of specimens as to their place of origin and the position in which found.

Other papers were: "Meteorological Instruments and How to Read Them," by Mr. R. Corless, of the Meteorological Office, and by Lieut. R. W. Ascroft, of the Food Production Department, on "Allotment Pests." Among the afternoon excursions may be mentioned visits to the New Transport Co.'s works at Battersea, where heavy goods are sorted by machinery, on the principle of a central goods clearing-house; to the church of St. Bartholomew the Great; to the classic Charlton Pits, under the guidance of the veteran geologist, Mr. W. Whitaker; to Kew, under that of Lieut.-Col. Sir David Prain and Prof. G. S. Boulger; and to the diving and mine-rescue apparatus works of Siebe, Gorman and Co., under the direction of Dr. J. S. Haldane. The congress was well attended, and apparently justified the council in deciding to hold it this year as usual.

THE TREATMENT OF MALARIA.[1]

THE treatment of malaria has engaged the attention of the medical department of the War Office since the outbreak of the war. So soon as cases of this disease began to return to England malaria hospitals were opened, and in certain large hospitals special wards were set apart so that all patients could be concentrated and treated by physicians with special knowledge of malaria. This branch of the medical work was placed under the supervision of Col. Sir Ronald Ross, K.C.B., F.R.S., consultant in malaria, War Office, and an interim report now published by this officer gives the results of treatment of a number of cases in four of the hospitals under his control up to the date of publication.

Before commencing treatments, 193 patients who had previously taken quinine, but who had recently discontinued the drug, were observed without further medication with the view of determining approximately the liability to relapse without further treatment. Of these 193 patients, 88 had relapses within twenty-seven days. Owing to illness (unfortunately not specified), 76 had to be given quinine without continuing the control. After a month, only 15 per cent. were free from relapse, and were considered well enough to be discharged; 85 per cent. were still showing symptoms of the disease.

Two thousand four hundred and sixty cases of malaria were treated under one or other of the following methods:—

(*a*) *Anti-relapse Quinine Prophylaxis.*—Quinine sulphate in small doses by different methods up to 60 grains weekly was given to 1040 cases. A dose of 10 grains daily was found to be more effective than one of 5 grains, and was more suitable than one of 15 grains, because, as well as being equally effective, it was better tolerated. Under these treatments relapses were reduced to 10 per cent., and even in relapses not so reduced the severity of the paroxysms was diminished.

(*b*) *Short Sterilising Treatments.*—Large doses of quinine sulphate, hydrochloride, or bi-hydrochloride were given daily for seven days, or on consecutive days up to ten days, to 334 cases. A high percentage of these cases relapsed.

(*c*) *Long Sterilising Treatments.*—Large doses of the same salts of quinine as in treatments (*b*) were given daily over long periods, continually, or on consecutive days, or at intervals of several days. Some of these treatments appear to have given the best results, especially the three treatments (*c*) 15, 16, and 17. Two of these were combined in the later stages with iron and arsenic. It may be noted that, in the experience of some observers, much intolerance is shown during the large dosage as here used, without more appreciable diminution of the number of relapses than results from less heroic lines of treatment.

(*d*) *Mixed Treatments,* including the administration of drugs other than quinine in the combinations generally used, were given in different doses for varying periods. The drugs used were tartar emetic, acid arsenoids, sodium quinine sulphonate, ethyl quitenine hydrochloride, and collosol quinine. Only a few cases were treated with each drug, as nearly all these relapsed.

Sir Ronald Ross points out that he has not noticed any marked superiority in the oral, intramuscular, or intravenous methods of administering quinine. He advises that a much larger number of cases should be controlled before the efficacy of any particular drug over others can be determined. Obviously it is necessary to observe cases carefully for a much longer period than twenty-seven days after they leave hospital before it is possible to decide what is the actual liability to relapse.

A generous diet is recommended during treatment, with a little stimulant in the form of beer or wine. Opinion seems divided as to whether patients should be kept in bed or not during treatment.

A second paper expressing the opinions of medical officers in the Salonika area as to the value of prophylactic quinine and on the treatment of malaria under different conditions of service was afterwards read by Sir Ronald Ross before the Society of Tropical

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[1] Society of Tropical Medicine. (1) An Interim Report on the Treatment of Malaria. (2) Report on a "Discussion on the Treatment of Malaria." Both by Sir Ronald Ross.

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